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This listing of claims replaces all prior versions and listings of claims in the application.

In the Claims:

1. (currently amended) A method of generating ~~providing associated shapes of~~ an optical lithography mask ~~in relation to predetermined main shapes of the mask~~, comprising:

generating simplified ~~layout~~ mask patterns from ~~the~~ predetermined main shapes ~~of the mask~~ by: eliminating detail from ~~of~~ the predetermined main shapes ~~which leads to unmanufacturable associated shapes~~ while preserving geometrically relevant shape information in the simplified mask patterns; ~~and~~

generating associated shapes relative to the simplified mask patterns; and

generating the mask to include the predetermined main shapes and the associated shapes, wherein the step of generating the associated shapes relative to the simplified mask patterns increases the number of edges of the predetermined main shapes which are assisted by the associated shapes.

2. (currently amended) The method according to claim 1 wherein ~~said~~ the associated shapes include sub-resolution assist features (SRAFs).

3. (currently amended) The method according to claim 1 wherein ~~said~~ the associated ~~features~~ shapes includes fill shapes.

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4. (currently amended) The method according to claim 1 wherein ~~said~~ the simplified ~~layout~~ mask patterns are generated through geometric manipulation.

5. (currently amended) The method according to claim 1 wherein ~~said~~ the simplified ~~layout~~ mask patterns are generated mathematically through application of rules.

6. (currently amended) The method according to claim [4]5, wherein ~~said~~ the rules provide for removal of indentations having one or more edges smaller than a predetermined dimension.

7. (currently amended) The method according to claim [4]5, wherein ~~said~~ the rules provide for removal of protrusions having one or more edges smaller than a predetermined dimension.

8. (cancelled)

9. (currently amended) The method according to claim ~~8~~ 1, wherein said step of generating the associated shapes increases coverage of the predetermined main shapes by the associated shapes ~~is maximized according to the~~ in accordance with a

product of the number of the assisted edges of the predetermined main shapes and the length of the assisted edges of the predetermined main shapes.

10. (currently amended) The method according to claim 4 wherein said the simplified layout mask patterns are generated by, for each of the predetermined main shapes by:

a) defining a quantity X based on the critical dimension of the predetermined main shape and the lithographic process;

b) shrinking from every side of the predetermined main shape by a the quantity X at least once to produce a resulting shape;

c) growing on every side of the resulting shape by the quantity X at least once to produce a grown resulting shape;

d) preserving a common region between the predetermined main shape and the grown resulting shape as the simplified mask pattern after said shrinking and said growing; and,

e) when if any feature of the common region smaller than said the quantity X remains, reducing the quantity X to provide a reduced quantity X and repeating said steps b) through e) shrinking, said growing, and said preserving said common region using the reduced quantity X until no feature of the common region smaller than said the reduced quantity X remains.

11-12. (cancelled)

13. (currently amended) The method according to claim 10 wherein ~~said reducing reduces~~ said step e) includes reducing the quantity X by a ~~given~~ predetermined fraction of the quantity X.

14. (currently amended) The method according to claim 4 wherein, for each of the predetermined main shapes, said simplified ~~layout~~ mask patterns are generated by:

a) defining a quantity X based on the critical dimension of the predetermined main shape and the lithographic process;

b) shrinking ~~from~~ every side of the predetermined main shape by ~~a~~ the quantity X at least once to produce a resulting shape;

c) growing ~~on~~ every side of the predetermined main shape by the quantity X at least once to produce a first grown resulting shape;

d) preserving a common region between the predetermined main shape and the first grown resulting shape ~~after said shrinking and said growing~~;

e) defining a quantity Y based on the critical dimension of the predetermined main shape and the lithographic process;

f) growing ~~from~~ every side of the first grown resulting shape by a quantity Y at least once to produce a second grown resulting shape;

g) shrinking ~~on~~ every side of the second grown resulting shape by the quantity Y at least once to produce a third resulting shape; and

preserving a common region between the predetermined main shape and the third resulting shape as the simplified mask pattern ~~after said growing and said shrinking~~.

15. (original) The method according to claim 14 wherein X and Y are not equal.

16-17. (cancelled)

18. (currently amended) A method of generating ~~providing associated shapes of~~ an optical lithography mask ~~in relation to predetermined main shapes of the mask~~, comprising:

a) ~~generating simplified layout patterns from the predetermined main shapes of the mask by,~~ for each of ~~the~~ a plurality of predetermined main shapes ~~:~~ defining a quantity X based on the critical dimension of the predetermined main shape and the lithographic process;

b) shrinking ~~from~~ every side of the predetermined main shape by ~~a~~ the quantity X at least once to produce a resulting shape;

c) growing ~~on~~ every side of the resulting shape by the quantity X at least once to produce a grown resulting shape;

d) preserving a common region between the predetermined main shape and the grown resulting shape as the simplified mask pattern ~~after said shrinking and said growing~~; and,

e) ~~if~~ when any feature of the common region smaller than ~~said~~ the quantity X remains, reducing the quantity X, shrinking every side of the common region by the reduced quantity X at least once to produce the resulting shape and repeating said steps c) through e) using the reduced quantity X ~~shrinking, said growing, and said preserving said common region~~ until no feature of the common region smaller than ~~said~~ the reduced quantity X remains; and

generating associated shapes relative to the simplified mask patterns; and

generating the mask to include the predetermined main shapes and the associated shapes, wherein the step of generating the associated shapes relative to the simplified mask patterns increases the number of edges of the predetermined main shapes which are assisted by the associated shapes.

19. (currently amended) A recording medium ~~recording~~ have a set of ~~machine~~ computer-readable instructions recorded thereon, the instructions being executable by a processor to perform ~~thereon for performing~~ a method of generating ~~providing associated shapes of~~ an optical lithography mask ~~in relation to predetermined main shapes of the mask~~, the method comprising:

generating simplified ~~layout~~ mask patterns from ~~the~~ predetermined main shapes

~~of the mask~~ by eliminating detail ~~of~~ from the predetermined main shapes ~~which leads to unmanufacturable associated shapes~~ while preserving geometrically relevant shape information; and

generating associated shapes relative to the simplified mask patterns; and

generating the mask to include the predetermined main shapes and the associated shapes, wherein the step of generating the associated shapes relative to the simplified mask patterns increases the number of edges of the predetermined main shapes which are assisted by the associated shapes.

20. (currently amended) The recording medium according to claim 19 wherein ~~said method further comprises~~, for each of the predetermined main shapes, said step of generating simplified mask patterns includes:

a) defining a quantity X based on the critical dimension of the predetermined main shape and the lithographic process;

b) shrinking ~~from~~ every side of the predetermined main shape by ~~a~~ the quantity X at least once to produce a resulting shape;

c) growing ~~on~~ every side of the resulting shape by the quantity X at least once to produce a grown resulting shape;

d) preserving a common region between the predetermined main shape and the grown resulting shape as the simplified mask pattern ~~after said shrinking and said growing~~; and,

e) when ~~if~~ any feature of the common region smaller than ~~said~~ the quantity X remains, reducing the quantity X, shrinking every side of the common region by the reduced quantity X at least once to produce the resulting shape and repeating said ~~shrinking, said growing, and said preserving said common region~~ steps c) through e) using the reduced quantity X until no feature of said common region smaller than ~~said~~ the reduced quantity X remains.

21. (new) The method according to claim 4 wherein said simplified mask patterns are generated for each of the predetermined main shapes by:

a) defining a quantity X based on the critical dimension of the predetermined main shape and the lithographic process;

b) growing every side of the predetermined main shape by the quantity X at least once to produce a resulting shape;

c) shrinking every side of the resulting shape by the quantity X at least once to produce a shrunken resulting shape;

d) preserving a common region between the predetermined main shape and the resulting shape after said shrinking and said growing as the simplified mask pattern; and,

e) when any feature of the common region smaller than the quantity X remains, reducing the quantity X to provide a reduced quantity X, growing every side of the common region by the reduced quantity X at least once to produce the resulting shape

and repeating said steps c) through e) using the reduced quantity X until no feature

smaller than the reduced quantity X remains.

22. (new) The method according to claim 4 wherein, for each of the

predetermined main shapes, said simplified mask patterns are generated by:

a) defining a quantity X based on the critical dimension of the predetermined

main shape and the lithographic process;

b) shrinking every side of the predetermined main shape by the quantity X at

least once to produce a resulting shape;

c) growing every side of the predetermined main shape by the quantity X at least

once to produce a first grown resulting shape;

d) preserving a common region between the predetermined main shape and the

first grown resulting shape;

e) defining a quantity Y based on the critical dimension of the predetermined

main shape and the lithographic process;

f) growing every side of the first grown resulting shape by a quantity Y at least

once to produce a second grown resulting shape;

g) shrinking every side of the second grown resulting shape by the quantity Y at

least once to produce a third resulting shape; and

h) preserving a common region between the predetermined main shape and the

third resulting shape as the simplified mask pattern.